Diehard Buildings

Control Architecture–a Challenge for the Urban Warrior

HOW DO CITIES control their populations, and how can the military benefit (or suffer) from current technology? How does urban design affect military mobility, responsiveness, and effectiveness? How should planners identify and consider control architecture when planning urban activities? What aspects of control technology should the military adapt and incorporate for military purposes?[1]

During early times, cities were designed to protect citizens from outside invaders. However, one aspect of city design was to protect richer and more-influential citizens from the depredations of the city's criminals or rioting mobs. Gated communities are relatively new to the United States but are common in other parts of the world, where high walls topped with broken glass protect the homes of the middle class and the well-to-do.

City planners today are not concerned with protecting cities from conquest; their first objective is usually traffic flow. Where security *is* a primary concern, however, planners seek to protect residents and high-value property from the city's more aggressive residents. Architects join planners in developing subtle ways to control public access to affluent residential areas, government buildings, banks, major firms, key industrial sites, and such buildings as presidential palaces. While the control aspect of urban design mainly interests architects, others, such as city planners, public safety officials, and military professionals, should be aware of such control aspects. For example, a country's military force might have to back up police and firefighters or capture a structure hardened by new technology.

Control architecture is the reasonably unobtrusive use of terrain, landscaping, structures, design, and technology to limit access, guide movement, thin and contain groups, or prevent entry to high-value buildings, urban centers, industrial sites, and affluent residential areas.

Military efforts to recapture important urban buildings are often spectacular. Examples are the 1980 British Special Air Service assault on the Iranian Embassy in London; the 1985 Colombian military assault on the Palace of Justice in Bogotá; and the 1997 Peruvian military assault on the Japanese Ambassador's residence in Lima. Since then, many

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key buildings have been hardened and incorporate new control architecture. Hardened buildings present challenges to the military attacker, especially when attackers must limit collateral damage.

Control Architecture

Cities have historically controlled their populations by restricting access; canalizing movement; positioning military barracks or police and fire stations at critical points; gathering intelligence from criminal and dissident elements; modifying public behavior through laws, religion, and education; controlling access to commodities; segregating castes, races, classes, and trouble-prone businesses into designated neighborhoods; controlling movement to and through key neighborhoods and centers; and maintaining a system of rewards and punishments for their citizenry. When these efforts fail, city officials call in the military to help restore order. Modern technology and design assist in urban control while complicating the terrain in which a military force might operate.

Control architecture is the reasonably unobtrusive use of terrain, landscaping, structures, design, and technology to limit access, guide movement, thin and contain groups, or prevent entry to high-value buildings, urban centers, industrial sites, and affluent residential areas. While often appearing to improve access to an area, control architecture actually allows a small security element to control or deny access. Television monitors detect the presence of unwanted elements, microphones monitor conversations, and operators can shut off escalators and elevators remotely or activate barriers on access ramps electronically. Guards can seal intruders into a holding area that appears to be a normal lobby. Many centers are self-contained, having their own water, food, and electrical supplies. Although primarily designed to withstand assaults by criminals, terrorists, and rioters, hardened buildings are also resistant to a military force attempting to gain entrance.[2] Potential military targets that have hardened designs and already incorporate control architecture include airport control towers, prisons, government buildings, embassies, and major industrial sites. Although not a standard military target, the modern shopping mall illustrates some aspects of modern control architecture.

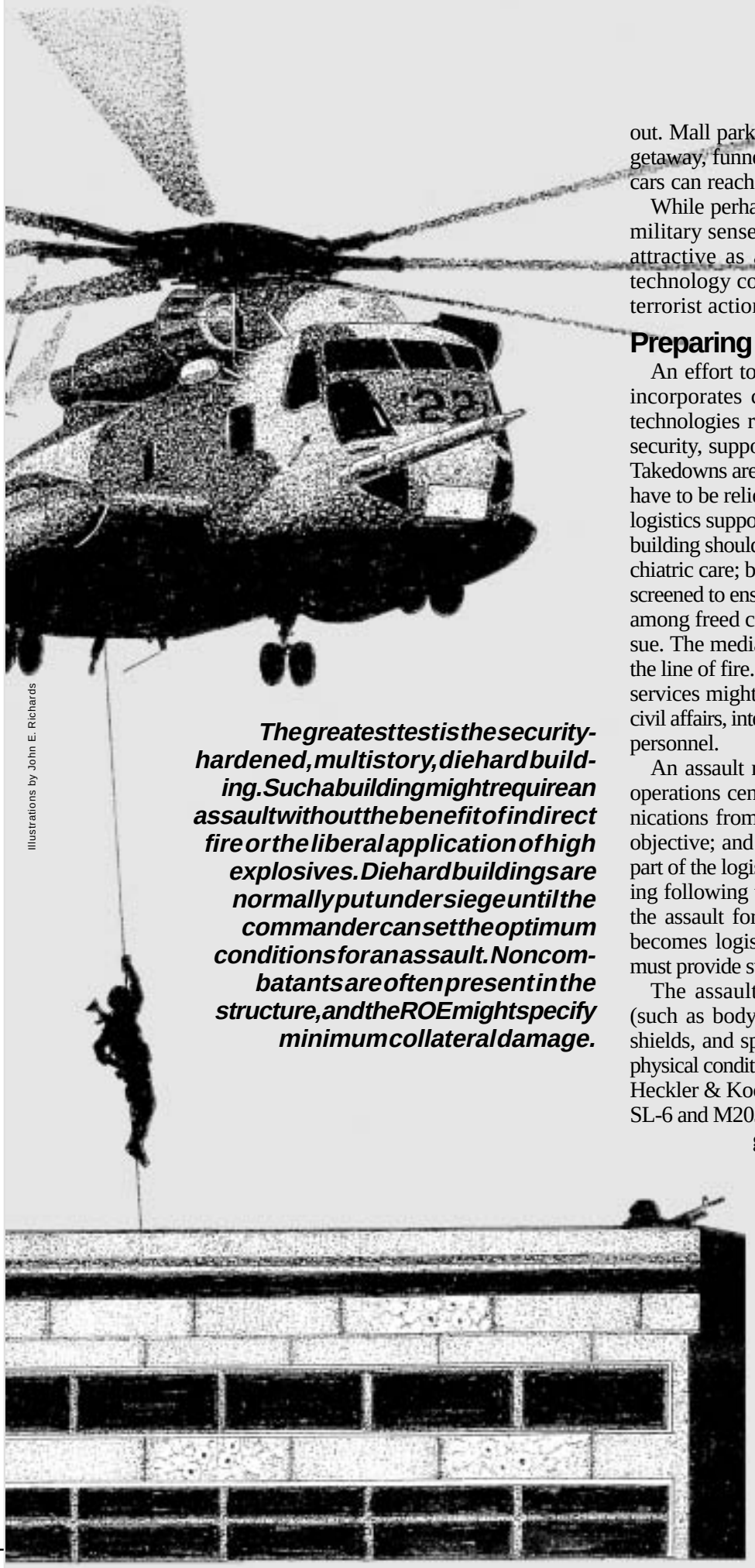
Hanging Out at the Mall

Shopping malls incorporate control architecture although they cannot withstand a major riot. Most large indoor malls are in trendier parts of the city where people do not riot. Planners design malls to move people slowly past a wide display of consumer goods while deterring theft. Although there are normally one or two entrances into a mall that open directly into the main passageway (theater and food court entrances), designers plan the mall and its parking areas so most shoppers will enter through a major department (anchor) store, which almost never has a straight passage to the mall's main passageway. Customers must take a circuitous route past a variety of displays before they exit the department store into the mall. Mall restrooms are located separately from the main shopping area and exits so shoplifters cannot quickly move into a restroom or exit with their loot.

When the mall is closed, drop gates, motion-detector systems, and alarms protect each store. Passage gates also seal off parts of the mall. . . . If troublemakers try to exit the mall in a hurry, they must thread a circuitous path to get out. Mall parking lots, designed to impede a quick getaway, funnel traffic to a few exits, which police cars can reach rapidly.

The customer is under surveillance starting at the parking lot. Centrally monitored closed circuit television (CCTV) cameras scan shoppers as they arrive. Security personnel check inbound shoppers against known shoplifters and undesirable individuals and identify troublemakers (usually groups of teenaged boys without adult supervision) before they enter the mall. New software programs can even identify known criminals by face-mapping shoppers as they move through the mall. Screeners notify and direct security personnel to watch suspect shoppers. Some uniformed policemen might be on duty in the mall, but most security personnel are in plainclothes. Control gates at individual stores electronically scan shoppers to detect tagged items not deactivated. Drop safes, silent alarms, segregated accounting offices, and armored cars protect large amounts of cash from armed robbery. Anchor stores also have their own security staff and control rooms, augmenting those of the mall.

When the mall is closed, drop gates, motion-detector systems, and alarms protect each store. Passage gates also seal off parts of the mall, while leaving the movie theater section open until late at night. The gates also offer quick protection in case of unrest in the mall. If troublemakers try to exit the mall in a hurry, they must thread a circuitous path to get



Illustrations by John E. Richards

The greatest test is the security-hardened, multistory, die-hard building. Such a building might require an assault without the benefit of indirect fire or the liberal application of high explosives. Die-hard buildings are normally put under siege until the commander can set the optimum conditions for an assault. Noncombatants are often present in the structure, and the ROE might specify minimum collateral damage.

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While perhaps not a likely target in a traditional military sense, an indoor shopping mall could be attractive as a terrorist target. Existing control technology could hinder terrorist success or anti-terrorist action.

Preparing for the Takedown

An effort to take or retake a large structure that incorporates control architecture and associated technologies requires a sizable force with assault, security, support, command, and reserve elements. Takedowns are seldom rapid events, so forces would have to be relieved or rotated regularly. Responsive logistics support is critical. Civilians from inside the building should be given necessary medical and psychiatric care; be interrogated for intelligence; and be screened to ensure that hostile forces do not exfiltrate among freed civilians. Crowd control will be an issue. The media should be informed but kept out of the line of fire. Local political leaders and municipal services might play major supporting roles, as will civil affairs, intelligence, and psychological operations personnel.

An assault requires an assembly area; a tactical operations center (TOC); a secure line of communications from the TOC and assembly area to the objective; and a secure logistics route. The critical part of the logistics route is where it enters the building following the assault force's initial entry. Once the assault force breaches the building, the effort becomes logistics-intensive. The support element must provide supplies without interruption.

The assault force requires special equipment (such as body armor, protective masks, ballistics shields, and special weaponry) and must be in top physical condition to haul this equipment around. The Heckler & Koch MP-5 family of submachine guns, SL-6 and M203 grenade launchers, and tactical shotguns are the current weapons of choice for clearing buildings. High-velocity munitions, such as the M16 uses, ricochet easily and raise the risk of fratricide. Shotgun ammunition runs the gamut from less-than-lethal beanbag rounds to 00 buckshot and flechette rounds. Also, Hydrashock® ammunition can take out the enemy without penetrating walls that separate friendly personnel. Stinger rounds

(rubber-coated bullets combined with irritant agents) are another option. Other special equipment for the assault force can include crowbars, axes, hammers, rope, detonating cord (to breach metal doors in metal frames), and electricians' tools. Knees and elbows get skinned quickly, so reinforced uniforms or knee and elbow pads are necessary.

Communications could be a problem. Tall buildings soak up FM radio transmissions, so landline communications might prove more reliable. However, an assault force does not want to trail wire behind it. A cellular phone or satellite communication radio might provide a partial solution.[3]

Fratricide prevention is an important issue. The assault force should consist of people who have trained together and know each other well. Often, the best plan is to have one platoon or company clear a floor, while another platoon or company clears the next, and then leapfrog. Armbands and passwords have limited value in close combat, but personal recognition can prevent tragedy. Thermal-imaging equipment can also help in an environment of cubicles and modular furniture.

Actions in a city are stressful, and even the best-conditioned troops tire. Troops must rotate regularly. The maximum period an assault force should be left in place without relief is 8 to 10 hours. Tired troops make mistakes. Mistakes can be fatal.[4]

The Big House: The Ultimate Gated Community

Not all structures are designed to be inviting. Prison walls, towers, and surveillance systems that keep prisoners in can also keep an assault force out. Military forces often support the police in regaining control of a prison. Restoring control can be an imposing challenge, but understanding how prisons organize security can help the planner considerably.

The contemporary prison is an imperfect model of a city. The prison has residential and work areas and areas set aside for meals, education, religious services, medical attention, sports, and entertainment. The prison provides the basic city services of heat, water, electricity, sewage, public health, and public safety. Guards segregate disruptive prisoners and put them into maximum-security areas, and the guards control traffic between residential areas and other areas carefully. Guards can isolate disturbances and divert or stop traffic quickly by closing barriers or narrowing passageways. CCTV cameras monitor common and key areas and trafficways.

Affiliated software can pinpoint locations and provide a record of individual prisoner activities and whereabouts throughout the day. Prison officials often reward well-behaved prisoners by promoting them to the privileged class—the trustee unit—with its segregated, more luxurious accommodations. Barcoded identification badges and bracelets allow prisoners to move between sections, eat meals, attend events and programs, and make purchases from the prison store, while at the same time guards are tracking their movements.

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The first task in capturing or recapturing a prison is containment. Intelligence efforts must determine what is going on while negotiators buy time. Prison towers are critical to the effort and are usually the last structures to fall to rioting inmates. Towers provide good fields of fire and observation. Assault forces should take towers first and garrison them with snipers. Inmates seldom have antitank weapons, so an assault force in armored vehicles can cross the open space around prisons to reach the towers. The architectural center of gravity, however, is usually the central control facility. Once this facility is secure, the assault force can capture the prison in coherent sections.[5]

Dealing with Diehard Control Architecture

Malls, prisons, airports, refineries, and other major structures present unique problems to the military attacker, mainly because of increased control architecture. Any of these structures could be a military objective, but the greatest test is the security-hardened, multistory, diehard building. Such a building might require an assault without the benefit of indirect fire or the liberal application of high explosives. Diehard buildings are normally put under siege until the commander can set the optimum conditions for an assault. Noncombatants are often present in the structure, and the rules of engagement (ROE) might specify minimum collateral damage. An

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assault force should conduct its attack on a large, multistory building in four phases:

1. Preparing and isolating the target area.
2. Gaining entry to the target building.
3. Conducting actions within the target building.
4. Mopping up once the building is secured.

The second and third phases require rehearsals and the adjustment of force structure and battle drills.

Preparing and isolating the target area. Buildings with modern control architecture are almost by definition high-value targets. They might guard valuables, such as gold or negotiable instruments; hold a wealth of information; or house vital command and control facilities. The main buildings in a city protected by modern control architecture have much in common. They have redundant surveillance systems with back-up power sources. As much space as possible surrounds buildings, and they might have blast walls to protect them. Landscaping does not interfere with observation. Rising or cable beam barriers, bollards, or sliding gates control vehicle access. Architectural elements control pedestrian access, and surveillance cameras monitor people as they approach the area. Large reinforced planters, modern statuary, and flagpoles usually block entranceways to keep vehicles from crashing in, and approach routes are in full view and monitored. Windowsills are higher than normal to prevent seated office occupants from being sniped at, and windowsills do not provide flat surfaces where someone could readily place an explosive device. Gas meters are in secure locations and air intakes are built high enough to prevent substances from being thrown into them.[6]

Once inside the building, the assault force can control access to important areas by limiting access routes, pass keys, surveillance cameras, and guards. These structures use many of the same features and devices that are part of U.S. Government buildings built after the 1995 bombing of the Murrah Building in Oklahoma City and the1998 bombings of embassies in Kenya and Tanzania. Generally, government and military buildings have ample buffer space around them. Civilian or commercial buildings lack keep-out distances because the owners wish to attract the public to keep the property profitable and because they usually cannot afford the real estate necessary to secure their sites.[7] Reconnaissance and intelligence are essential to developing a complete picture of external defenses and movement—canalizing structures, the layout of the building, guard posts, high-value areas, and critical sites within the building.

When an assault force must retake a protected building, the force also must control the surrounding neighborhood to deter enemy reinforcement, warning, and intelligence. Security forces seeking to retake an occupied building can use roadblocks, traffic control points, patrols, snipers, and helicopters to contain the target building. If the assault force is trying to take the building by surprise, the force should not disrupt normal neighborhood traffic flow until the last minute. Pedestrian traffic and the targeted building's CCTV will make it difficult to gain control of the neighborhood without disclosing the security force's presence.[8]

Gaining entry to the target building. If possible, the attacking force should not enter the target building through normal entrances. Planners design control architecture to prevent such entry. Security in improved structures protects against a ground approach, so the buildings are less well protected from a top-down assault. Entry to the facility might be through secret, subterranean passages, so detecting and locating such passages is important to the assault force. Often, a modern or modernized building's electrical power, water, sewage, gas, and other utility lines pass through a common, readily accessible tunnel. City utilities should have plans, keys, and maintenance schedules for these tunnels.

There are drawbacks to entering a building through a tunnel. A slow, sneaky entry creates stress among assault personnel, who must move through a confined space wearing bulky gear and carrying tools and 50-pound ballistic shields. Also, if a tunnel is the only entry into the building, it will have to be the two-way conduit through which supplies move. The tunnel might also have to be the evacuation route for casualties and noncombatants. In addition, there might be an environmental danger of spilled chemicals, such as PCBs, in the tunnel,

particularly in parts of the world where environmental inspection is not rigorous.

Roping down from helicopters is another option for gaining entry and supplying or re-supplying an assault force. However, unimpeded access to the roof is not always easy to gain or maintain, particularly at night or during inclement weather.

As the force approaches a building, it might have to contend with blast curtains; window films; shatter- and bullet-resistant glass; intrusion detection systems; and high-security locks. The assault force can use armored vehicles to get close to the objective, create entry points into the building, provide initial entry above the ground floor, and provide supporting fire or extraction fire should the assault fail. Armored vehicles provide a natural focus, so the force might use them to create a ruse while the main entry force ropes down from helicopters, enters through a subterranean tunnel, or blasts a hole into the building. The force could use trucks with elevating beds, such as those that supply commercial airlines, to gain upper-story access.

Conducting actions within the target building. Once the force is inside the building, it might encounter controlled-access doorways, protected workstations, CEO safe rooms, locked utility closets, and back-up power-generating systems. Incapacitating gas could fill the entryways and halls. Smoke or the loss of lighting could frustrate navigation. Small groups must move rapidly to seize critical nodes in a building, while a follow-on force deals with remaining resistance. The operational control center, fire command center, security control, and monitoring center are usually collocated and are prime targets.[9]

The commander should garrison the building as the force clears it. A smart enemy might bloody the nose of the attacking force, break contact, then re-occupy a floor once the attacking force moves on.[10] The enemy could thus split the assault force from its reinforcements or logistics and force a fight on the defenders' terms.

Mopping up once the target is secured. Once the force secures the building, actions are situation-dependent, but the commander must anticipate what

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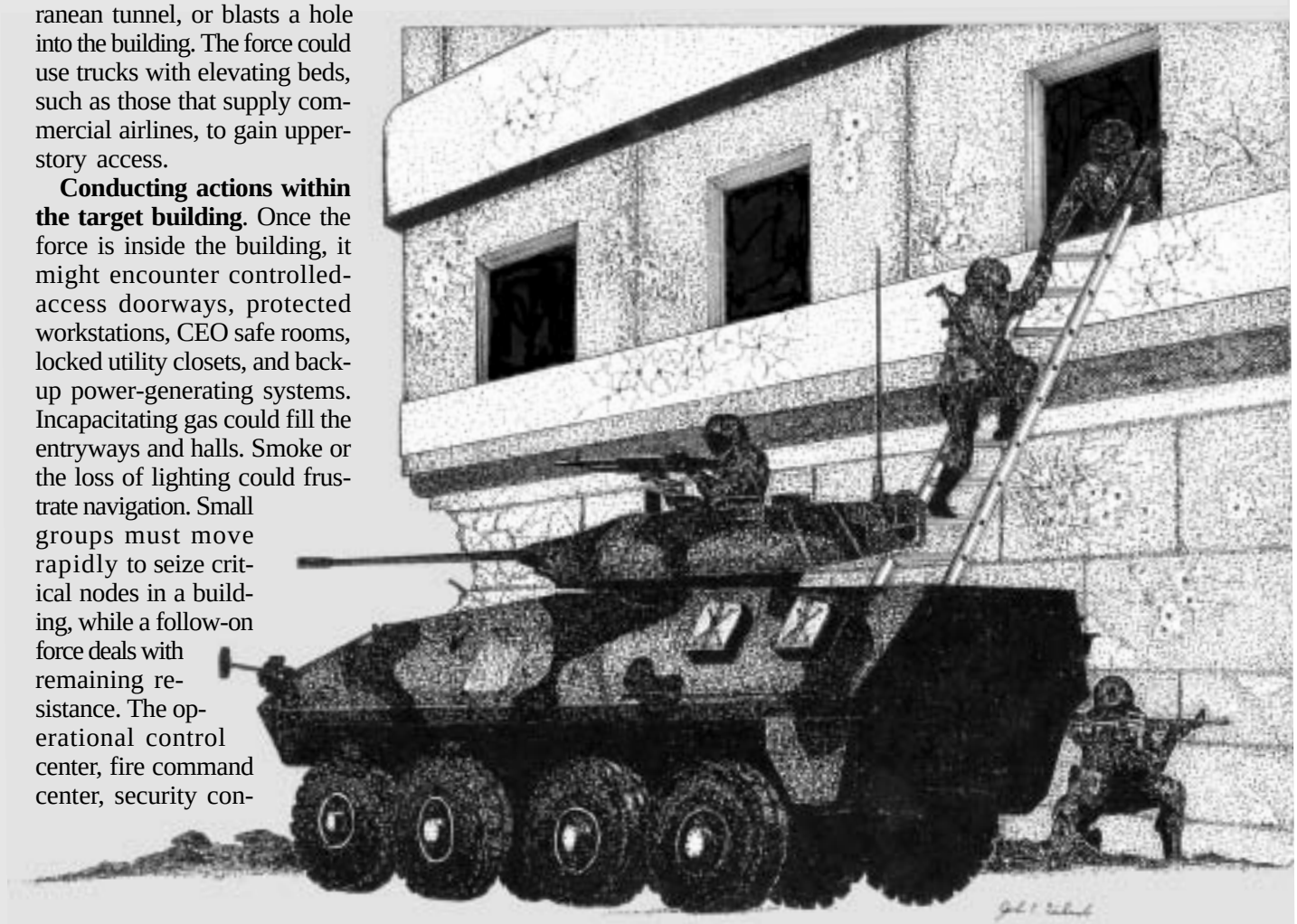

Every city has a unique heritage with a unique urban layout based on its evolving history of properties and security threats to its citizens. Where designs correctly address the threat and where sufficient resources are spent on protection, urban design proves successful.

might happen next. Besides the routine issues of handling prisoners, treating the wounded, and securing the building, the commander might have to help firefighters; evacuate documents and materials; restore utilities; return control of the facility to civilian authorities; and garrison the building for a time, since the enemy might try to recapture it. The capture of a single building might not be a military unit's sole mission. The military planner needs to understand the urban system and how other control technologies affect his mission.

Physical, Electronic, and Organizational Technologies

Long after initial construction, the work of architects, engineers, and urban designers continues to influence security planning. Every city has a unique heritage with a unique urban layout based on its evolving history of properties and security threats to its citizens. Where designs correctly address the threat and where sufficient resources are spent on protection, urban design proves successful. Over time, however, even the best structures become relics. Such structures will still affect military offensive and defensive planning. The old walls and access ways can constrict or channel movement and provide cover. Conversely, urbanization often outpaces efforts of city planners, engineers, and architects to curtail violence. In large, modern urban terrain, no security-based architectural heritage exists. City planners attempt to control crime through surveillance, intelligence operations, patrolling, police reaction, and access control.

The widespread use of CCTV makes it harder for any activity to go unnoticed. CCTV surveillance is the modern substitute for conscientious (or nosey) neighbors. Night-vision technology and helicopter surveillance using television and heat sensors add to police-surveillance capabilities. Passive millimeter-wave imaging can scan people up to 12 feet away and see through clothing to detect concealed weapons, packages, and contraband. Improved surveillance technology allows police to devote less time to investigating crime (reactive law enforcement) and more time to proactive police work by tracking criminal elements. While most police work remains reactive, preemptive policing allows the police to ignore the majority of law-abiding citizens and concentrate on certain groups.[11]

Modern police intelligence operations greatly supplement the reports of the cop on the beat and the police snitch. Expensive computers and other electronic technology play significant roles. Automatic telephone tapping, voice recognition, and electronic tagging increase the police force's power and reliability. Some machines automate human actions by monitoring activities, detecting crimes, and handling communications, which release policemen for other jobs.

Information technology allows rapid access to information about a suspect's records, cash transactions, car registration, and credit history. Automatic fingerprint readers are common, and biometric technologies are being built that will measure and recognize genes, odor, signatures, retina, DNA, and faces. Some bugging devices do not even require entry into the target area, but can be connected to the subscriber's telephone line. Computers can track data on suspects and produce contact network charts (link analysis) showing who associates with whom.[12] Data files can track gang membership and patterns of behavior; criminal methods of operation; locations of known criminals and ex-convicts; and movement routes through various areas. Cellular phone-call tracking and global positioning satellites (GPS) allow police to track a suspect's whereabouts. Geographic profiling software takes the locations of past crimes and, using mathematical algorithms, calculates the probabilities of the perpetrator's residences.[13] Crime analysis mapping software is valuable in predicting when and where a bank robber might strike next. Software can also identify areas that require attention during the redistricting of cities or when allocating law enforcement resources.[14]

Police foot and vehicle patrolling remains effective in reassuring law-abiding citizens and to warn off those whose intent is less righteous. Alarms, CCTV, and aerial patrolling supplement the patrolling effort. Technology enhances police reaction and provides video feed of an ongoing crime, of locations of units in the vicinity, and of pertinent intelligence data.

Street design plays a major role in controlling access. Street designs can discourage high speeds, reduce the opportunity for fast getaways, and high-

light drivers unfamiliar with the neighborhood. Cul-de-sacs are particularly useful. Narrow streets, speed bumps, on-street parking, and narrowing streets at intersections also discourage outsiders.

Using the Local Police

Special weapons and tactics (SWAT) teams or tactical operations units (TOUs) are a comparatively recent phenomenon in law enforcement. In the late 1960s, Los Angeles Police Chief Daryl Gates established a paramilitary police unit to deal with snipers, terrorists, and hostage situations. Despite initial widespread resistance, such units are now common. As of 1995, 89 percent of law-enforcement agencies serving populations of 50,000 or larger had SWAT or TOU forces. Approximately 20 percent of the departments without one were planning to establish one within a few years. Of the reported 25,201 callouts of these forces in 1995, only 1.3 percent were for civil disturbances, 0.09 percent were for terrorist incidents, 3.6 percent were for hostage situations, and 13.4 percent were for barricaded persons. Most callouts were for high-risk warrant work, the bulk of which were drug raids.[15] Many drug houses are armored and protected better than the average domicile. The local SWAT team has ample experience in taking down small, protected buildings.

No standard exists for SWAT team equipment, but U.S. SWAT teams generally have M16s because M16s are free issue by the Federal Government. However, the ballistics of the M16 round are not optimum inside a building. All SWAT teams have tactical shotguns, as do all police departments. The shotgun is as common as the handgun in police work. Most SWAT teams prefer using shotguns along with pistols and MP5s.[16]

Linking up with the local police is the preferred starting point for the military force, but this is not always possible. If a city has a SWAT team, the team could take the lead while the military provides backup. If the main task falls to the military, the police could help deal with particular structures and neighborhoods. The police know the sociocultural environment intimately and could help determine ROE, allowable force, and expected reactions. The military brings a lot of firepower and heavy equipment to the mission. The police can modify firepower and equipment to mitigate its effect on the peaceful population.

Get Me a Map and the Building Plans

Maps are essential for planning, but traditional military maps are often useless in a city. They are usually out of date, the wrong scale, lack street names or index, and are laid out using the Universal Transverse Mercator (UTM) system. Raw urban intelligence data normally reference addresses, street intersections, shops, and offices.

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The military planner must have a good local city street map and aerial photos. However, a city map coupled with aerial photography still does not provide essential data to the military planner. Vital missing data might include building materials and construction standards for various structures; wall thickness; building supporting weight; building codes and which buildings actually meet these codes; underground tunnels and conduits connecting buildings; locations of basements and cellars; soil composition; water tables; individual building plans; road carrying capacity; and traffic pattern analyses. The title registry or tax assessor's map, which is often in a scale as high as 1:2,000 and showing ownership data, contact information, and utility easements, is sometimes useful.

Frequently data are available at the offices of the city planner, the city engineer, the tax assessor, the local housing authority, or at fire departments, police stations, utility departments, nonprofit housing agencies, libraries, and fire insurance companies. Depending on the locale, the information might be on the Internet. Today, the Technical Engineering Center at Fort Belvoir, Virginia, and other mapping organizations design and produce maps of urban areas that are better suited to the military planner.

The military planner might also need urban maps showing abandoned houses, gang activity, disease outbreaks, medical support facilities, parking facilities, food warehousing areas, and other specialized information. Computerized mapping could help the military planner by combining GPS information with statistics gathered by government or private agencies. These maps can be updated and reprogrammed to display selected data.[17]

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Building plans might be difficult to obtain. The building's owner might have the plans, but they might not be readily accessible. The city planner might have copies. General building layouts available to the public might be incomplete or deliberately inaccurate. Floor plans for modular or multiuse buildings might be quickly outdated because of remodeling.

Architectural Future

Urban design is changing. High-value organizations and businesses are moving from city centers to the suburbs. Instead of one main building, various smaller buildings are arranged in a campus setting, each with its own parking garage. Access to the campus is easy but not access to individual buildings. Each building has its own security and control architecture. Traffic access is an overriding consideration to facilitate travel flow from the campus' interior grounds to an outer ring. To reduce traffic volume, the campus usually has its own barbershop, restaurants, gym, cleaners, and other facilities so employees can remain on site all day.

The era of the large enclosed shopping mall is ending. The cost of heating and cooling large areas has led to the development of the extended mall, consisting of separate stores laid out over a large area in a zigzag pattern. This pattern restricts traffic speed and allows the customer to drive slowly from store to store rather than walking the extended distances of an enclosed mall. The same principles of control and security apply to the new pattern-extended mall.

New building design replaces expensive masonry with steel and glass. While such buildings are less sturdy, they are quicker and cheaper to construct. The single-membrane roof is now more common than the sloping, gabled, or peaked roof. Also, commercial office buildings are being built to cheaper standards than are government and university buildings, which are built to endure longer.

Before the Oklahoma City bombing, government buildings were often built downtown in an effort to revitalize downtown areas. In the United States at least, the building trend is moving away from constructing tall federal buildings downtown to constructing lower buildings in the suburbs with ample space and blast protection around them, such as in the campuses of high-profile government agencies, including the Federal Bureau of Investigation; the Bureau of Alcohol, Tobacco, Firearms, and Explosives; and the Internal Revenue Service. Government buildings now have a limited number of entrances and smart-card control. Similar trends might be occurring in overseas urban areas.

Urban operations are difficult, and armed action against city buildings severely tasks even well-trained, well-equipped units. Assaulting modern buildings that incorporate control architecture increases the commander's challenge and demands thorough planning, detailed intelligence, specific ROE, special equipment, and multiple mission rehearsals. As modern militaries consider urban areas, the chances increase that they will have to deal with diehard buildings. They must be prepared. ***MR***

NOTES

1. Much of the information in this article came from interviews with Command Sergeant Major Angel Febles, 1st Battalion, 509th Infantry, Fort Polk, LA; Corporal Douglas Edgington, Franklin County Sheriff's Office SWAT team, Columbus, OH; Tom Mink, Security Manager, Commerce Bank, Kansas City, MO; Captain Don Hinton, 1st Reconnaissance Battalion, 1st Marine Division; and Colonel (Retired) John Brake, Vice President, and Woody Overton, Consultant, J.E. Dunn Construction Company, Kansas City, MO.
2. Lester W. Grau and Jacob W. Kipp, "Urban Combat: Confronting the Specter," *Military Review* (July-August 1999): 16.
3. Grau, "Urban Warfare Communications: A Contemporary Russian View," *Red Thrust Star* (July 1996).
4. As with any action, training and rehearsals are key. They are particularly key in the urban environment against these unique objectives. The occupying enemy has the home-court advantage, so training and rehearsals are one effective counter to that advantage.
5. If the military force plans to use special gear, such as nonlethal weapons and incapacitating gas, the force must train with them extensively before use. Rehearsal is especially important when preparing to capture a prison.
6. Lois Pilant, "Planning and Designing Police Facilities," *The Police Chief* (March 1995): 31.
7. Mohammed Ettouney, "Blast Resistant Design of Commercial Buildings, Practice Periodical on Structural Design and Construction," vol. 1, no. 1, on-line at <www.wai.com/AppliedScience/Blast/blast-struct-design.html>, February 1996.
8. Technology is often a substitute for manpower and could actually provide less security. After installation of a CCTV system, the building manager often reduces the guard force, leaving one guard to babysit a bank of television monitors. If the guard has too many monitors to watch, he cannot observe closely what is going on.
9. Randall Atlas and Anthony DiGreggario, "Designing Against Terror: Site Security Planning and Design Criteria," in *Architectural Graphics Standards,* revised 1999, on-line at <www.cpted-security.com/cpted4.htm>.
10. The commander must set a policy on first aid well before the action. When a team member is shot, the normal response is to stop and provide first aid. This might stop the attack's momentum and provide reaction time for the building defenders. Medics must follow the force closely to treat the wounded so combatants will not stop to aid companions.
11. Steve Wright, "An Appraisal of Technologies for Political Control," Consultation version (Luxembourg: European Parliament, 1998), 9-10. This appraisal broadly applies preemptive policing; however, it could also become racial or class profiling and draw political fire.
12. Ibid.
13. Pilant, "Crime Mapping and Analysis," *The Police Chief* (December 1999): 39.
14. Ibid., 44.
15. Peter B. Kraska and Larry K. Gaines, "Tactical Operations Units: A National Study," *The Police Chief* (March 1997): 34.
16. Ibid., 36, 38.
17. Pilant, "Computerized Crime Mapping," 60.